Implementing HSI in Undersea Programs: How Are We Doing – Really ?

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Implementing HFE/ HSI

- The latest projects with influence from HSI at EB
  - Virginia
  - CVN 78
  - Delivery Platforms
  - Concept Platforms
  - Task Analysis
  - Manning Reduction Efforts
  - Manning Assessments

Implementing HF on CVN 78

- What requirements were called out ?
- How much participation did the HSI team have in defining the requirements ?
- The time line of the program when HSI requirements were specified ?
- How much interaction did the HSI team have with the design team ?
- How embedded in the process were the HSI participants ?
- Was a concurrent engineering approach used ?
- How much impact did HSI have on the design ?
- What overall impacts did HSI have on the program ?

What requirements were called out?

- Nuclear Regulation 0700 B was the primary base of requirements.
  - It was modified into a project specific variant that fit the use for our plant design the HFE Guidelines were this modification of NUREG 0700 B
  - Also produced was the Graphical Display Requirements and Stand conventions.
- NUREG 0711 Human Factors Engineering Program review Model
- MIL-STD 1472 F
- MIL-HAND BOOK 46885
- DOD-HDBK-743A
- Visits to the
  - ICE Lab at Dahlgren , VA
  - Smart Ship in Philadelphia , PA
  - JOCELN, Newport News, VA.

Who developed?

- HSI TEAM
  - Electric Boat Corp.
  - Northrop Grumman Newport News Shipbuilding
  - Northrop Grumman PCS
  - Bechtel-Bettis
  - Knolls Atomic Power Lab
  - Commander Naval Air Forces Fleet representatives
- Reviewer
  - NAVSEA Code 08

How much participation did the HSI team have in defining the requirements?

- How were they specified?
  - The goal from the Navy was to reduce manning by 50% in the Propulsion Plant Area
    - Manning and Ops group orchestrated the preliminary
    - The HSI group verified the findings
- At what level of detail?
  - Formal written requirements, both high level and detailed that underwent a formal comment, review and approval cycle.
  - The HSI Group had significant input with the design of Control Panels through out the Engineering Spaces

The time line of the program when HSI requirements were specified (e.g., concept design, preliminary design, etc).

- At the preliminary design, for CVN 78

How much interaction did the HSI team have with the design team?

- Significant.
  - Functional requirements
  - Planned area requirements
  - Display Page Working Group (HSI formed group)
    - Working with :
      - I and C
      - Power
      - Components
      - System Engineers
      - IT Engineers
  - Human friendly / Practical equipment

How embedded in the process were the HSI participants?

- Very
  - The HSI group still play a very active role as the design is still maturing.
  - HSI group participated Rapid prototyping of Engineering spaces
  - HFE Working Group is still actively participating in the latter stages of design.

Was a concurrent engineering approach used?

- Integrated Product Team's (IPT's)
  - All members attended and successfully completed the Integrated Product and Process Development Workshop.
  - IPT's hold regular meetings with attendance from the Core and Support Groups.

How much impact did HSI have on the design?

- Was usability testing performed?
  - Under methodology
- At what point in the program?
  - Preliminary design phase
- What methodology?
  - lots of demonstrations,
  - rapid prototyping,
  - complex demonstrations to NAVSEA.

What overall impacts did HSI have on the program?

- Helped meet manning and plant simplification goals.

– What benefits were you able to provide?

- Improved the concept of plant operations over prior designs.

– Were there any hard spots?

- Traditional, a paradigm shift,

– How resolved?

- Needed to establish credibility and take the time to walk those who doubted the need for HSI through why it was important in a respectful manner.
- CANT BE ARROGANT ABOUT HSI